REMARKS

Entry of the amendments is respectfully requested. Claims 1-31 are pending in the application. Claims 10, 16, 25, and 31 are amended. Favorable reconsideration and allowance of this application is respectfully requested in light of the foregoing remarks.

1. Objections to the Claims

The Examiner objected to the claims because of an informality. Specifically, the Examiner indicated that "selective" should be replaced with "selectively" in claims 16. Also, the Examiner indicated that "the front link" should be changed to "a front link" in claim 25. The Applicants have amended claims 16 and 25 in accordance with the Examiner's suggestions. Accordingly, withdrawal of the objections is respectfully requested.

2. Rejections of the Claims

a. Recapitulation of the Invention[1]

The invention relates to a roller assembly for a lawnmower that is towed behind the lawnmower's deck and that rides along the surface of the ground for purposes of placing decorative stripes on freshly cut grass. The roller assembly generally includes a tow arm having first and second links. The first link is configured to be supported at least indirectly on a frame of a lawnmower. The second link is connected to a shaft mounted with one or more rollers. A

[1] This Section 1 is intended to provide the Examiner with some background information on the state of the art and applicants' contribution to it. It is *not* intended to distinguish specific claims from the prior art. That task is performed in Section 2 below.

spring is disposed between the first and second links and configured to bias the second link downwardly relative to the first link, thereby biasing the rollers against a ground surface. The roller assembly further includes a quick-connect assembly for rapid attachment and detachment of the roller assembly to the lawnmower. The roller assembly yet further includes a latch assembly configured to hold the second link and shaft of rollers in a raised position relative to the ground surface.

The roller assembly of the present invention does not support and, indeed, is incapable of supporting, the cutting deck on the ground. If the rollers are raised or removed, the cutter deck is held in its desired position by other support structure, and cutting would proceed normally.

b. Indication of allowable subject matter

Applicants wish to thank the Examiner for the allowance of claim 31, and for the indication of claims 4-8, 11-15, 18-19, and 26-28 as containing allowable subject matter if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

c. Rejections under 35 U.S.C. § 102(b)

Claims 1-3, 9-10, 20-25 and 32 stand rejected under § 102(b) as being anticipated by U.S. Patent 2,032,784 to Worthington. The Applicants respectfully traverse this rejection because, as is discussed below, the Worthington patent does not disclose each and every element of the novel subject matter disclosed and set forth in the claims. Therefore, reconsideration is in order and is

respectfully requested.

Independent claim 1 recites a roller assembly for a lawnmower. The roller assembly includes a tow arm having first and second links. The first link has a rear end that is pivotally attached to a front end of the second link, and a front end configured to be supported at least indirectly on a frame of the lawnmower. The roller assembly further includes a shaft supported and at least indirectly coupled on the second link, and at least one roller disposed on the shaft. The roller assembly further includes a spring disposed between the first and second links and configured to bias the second link downwardly relative to the first link thereby to bias the roller against a ground surface.

In contrast, the Worthington patent discloses to a gang lawn mower having a so-called "gauge" roller 4 that forms the same general function as a wheel, i.e., they support part or all of the weight of a cutter deck on the ground (Abstract and Fig. 4). The gauge roller 4 is mounted on a shaft 5 and supporting the front end of the mower from the ground surface (Col. 2, lines 25-38). The location of the gauge roller 4 relative to a cutter mechanism dictates the height of the grass (Col. 2, lines 43-50). If the rollers were to be raised or removed, the cutter deck would rest directly on the ground. The gang lawn mower further includes a helical spring 13 (Col. 2, line 54; Figure 4). The Worthington patent discloses that the helical spring 13 serves to hold an actuating arm 9 against an adjustment T-hand 12, and to prevent accidental rotation of a wing nut configured to control the position of the gauge member 4 with reference to the cutter mechanism, thus maintaining the desired cut height of the grass (Col. 3, lines 10-22).

The Worthington patent does not disclose a spring disposed between the first and second links and configured to bias the second link downwardly relative to the first link thereby to bias the roller against the ground surface. The spring 13 illustrated in the Worthington patent, and alleged by the Examiner to correspond to the claimed spring, does not bias the links at all because the links are held in-place by the head 12 of the adjusting screw 11. More importantly, were the head 12 not in-place, the 13 spring would bias the roller assembly *upwardly* rather than downwardly as claimed. Fig. 4 in the Worthington patent illustrates that the compression spring 13 applies an axial biasing force against the arm 9, driving the arm 9 and the attached rock shaft 7 to rotate in an upward direction. It is apparent from Fig. 4 in the Worthington patent that this upward rotation drives roller 4 generally in an upward direction, rather than in the claimed downwardly direction towards the ground.

The Examiner's citation of *Ex parte Obiaya* regarding this important difference s misplaced for two reasons. First, *Obiaya* deals with obviousness, *not* anticipation. If the Examiner continues to believe that the *Obiaya* case is applicable, is requested to withdraw his grounds for rejection and issue a new rejection based on obviousness. Second, and perhaps more importantly, the claimed biasing function does *not* result naturally from following the suggestions of the Worthington patent. To the contrary, to the extent that any roller biasing occurs at all, the Worthington patent teaches directly away from the claimed invention by disclosing a spring that biases the roller upwardly away from the ground rather than downwardly toward the ground.

In view of the above arguments, the Worthington patent does not disclose each and every element of claim 1. Accordingly, Applicants respectfully request withdrawal of the rejection.

Dependent claims 2-3 and 9 are believed to be in condition for allowance for incorporating by reference the limitations of claim 1 and for defining additional features of the invention, which, when considered in combination with those of claim 1, are not anticipated by the prior art relied upon in the rejection. For example, the Worthington patent does not disclose a *torsion* spring as required by claim 2. Rather, the spring 13 shown in the Worthington patent is instead a *helical* spring. The Examiner's statement regarding the claimed torsion spring is completely unfounded. Torsion springs do have at least one coil. That does not, however, render the compression spring 13, as illustrated in the Worthington patent, to be the claimed torsion spring. The difference is notoriously well-known in the art. That is, a torsion spring is characterized as a spring which operates with a coiling or uncoiling action. *See, e.g.,* the glossary at http://www.patrickmfg.com/glossary2.htm, a copy of which is attached as Appendix A. The potential energy of a torsion spring is generated by twisting the spring to circumferentially tighten or reduce the radius of the coil or coils, and it is released by permitting the coil or coils to expand radially. The biasing effect therefore is always angular or circumferential rather than axial. The Day patent discloses a standard helical compression spring which is also loaded axially (see Appendix A). That is, the potential energy is saved by compressing the coils of the spring axially and released by permitting the spring coils to expand axially. For reasons similar

to those described above with respect to the Worthington patent, the Day patent does not disclose or suggest the claimed torsion spring.

In another example, in regard to claim 3, the Worthington patent does not disclose or suggest a quick connect assembly that includes a rod mountable on one of a) the first link of the tow arm and b) the lawnmower frame, and a sleeve mounted on the other of the first link of the tow arm and the lawnmower frame, the sleeve configured to be inserted over the rod to thereby attach the tow arm to the lawnmower frame.

Claim 10 as amended recites a roller assembly for attachment to a lawnmower frame. The roller assembly includes, *inter alia*, a tow arm, at least one roller disposed on a shaft and configured to contact and ride along a ground surface, and a quick connect assembly. The quick connect assembly has a sleeve mountable to one of a) a front end portion of the tow arm and b) the lawnmower frame, and a rod mountable on the other of the front end portion of the tow arm and the lawnmower frame. The quick connect assembly is detachably attachable to the sleeve to thereby detachably connects the tow arm to the lawnmower frame.

The Worthington patent does not disclose a roller assembly having a quick connect assembly for attachment to a lawnmower. Rather, the Worthington patent discloses a gauge roller assembly having rock shaft 7 journaled at the forward ends or brackets of the side frames of the lawnmower (Col. 2, lines 38-43). The Worthington rock shaft 7 can be rotated to adjust the position of the gauge member with respect to the cutter mechanism, thus "changing the height of the cut" (Col. 2, lines 43-49). The rock shaft 7 and gauge assembly support the

lawnmower from the ground, and thus are not for quick attachment to a lawnmower.

The Examiner alleges that the yoke on the arm 6 of the rock shaft 7 as disclosed in the Worthington patent corresponds to the claimed sleeve, and that the disclosed pin or shaft of the rock shaft 7 in the Worthington patent corresponds to the claimed pin. However, the arm 6 and shaft of the rock shaft 7 disclosed in the Worthington patent are formed integrally with one another and always rotate together as a unit. The Worthington rock shaft 7 and arm 6 cannot be separated from one another and any way to facilitate attachment of the roller assembly to a lawnmower frame. In view of the above arguments, it should be noted that even if the Examiner were disinclined to permit entry of this proposed amendment, the Examiner still would have to withdraw the rejection of claim 10 because the Worthington rock shaft 7 cannot correspond to the claimed shaft.

Therefore, the Worthington patent does not disclose each and every element of the claim 10. Accordingly, Applicants respectfully request withdrawal of the rejection.

Claim 16-17, 29, and 30 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,044,534 to Day et al. The Applicants respectfully traverse this rejection because, as is discussed below, the Day et al. patent does not disclose each and every element of the novel subject matter disclosed and set forth in the claims. Therefore, reconsideration is in order and is respectfully requested.

Claim 16 as amended recites a roller assembly for attachment to a lawnmower. The roller assembly includes, *inter alia*, a plurality of rollers disposed on a shaft coupled to a tow arm at

least indirectly supported by a lawnmower. The roller assembly further includes a latch assembly configured to be selectively engageable to latch a rear link to a front link of the tow arm in a manner that holds the roller assembly in a raised, inoperative position in which the rollers are incapable of riding along a ground surface. The latch assembly includes a latch pin which is selective movable between a retracted-position where the latch assembly is disengaged to an extended position in which the latch assembly is engaged.

Similar to the gauge assembly of the Worthington lawnmower described above, the Day et al. patent relates to a lawn mower 10 having a rear roller assembly 15 operable to dictate a location of a cut bar 24 and thus a cut height of a grass lawn (Col. 2, lines 8-10). The roller assembly supports the lawnmower on the ground (Col. 1, lines 62-67). The position of the rear roller assembly 15 is fixed by a plunger 114 engaged with one of a series of notches 112, thereby setting the cut height of the lawn (Col. 4, lines 1-8). The Day et al. patent does not disclose a roller assembly for attachment to a lawn mower in the manner claimed. Moreover, the Day et al. patent does not disclose a latch mechanism configured to hold the roller assembly in a stowed, non-operative position. The plunger and related components that allegedly correspond to the claimed notches cannot hold the Day et al. roller assembly in a stowed, non-operative position as recited by claim 16. To the contrary the Day et al. rear roller assembly is structurally essential to support the lawn mower on the lawn (Col. 1, lines 62-67). Thus, the Day et al. patent does not disclose each and every element of the claimed invention.

Claim 16 as amended recites an inoperative position where the rollers are incapable of

riding along the ground surface. As noted above, the roller assembly disclosed in the cited Day et al. patent *cannot* be latched in the claimed manner because the Day et al. roller assembly is a gauge roller that always rides along and supports the cutting deck from the ground surface. The alleged roller assembly in the Day et al. patent could not possibly be latched in a raised position in which it does not ride against the ground as recited in claim 16. To the contrary, ground engagement of the Day et al. roller assembly is essential to proper operation of the Day et al. lawnmower.

As with the rejections based on the Worthington patent, the Examiner cites the *Ex parte Obiaya* case and contends that the Applicant has done nothing more than recognize another advantage that flows naturally from following the suggestions of the prior art. Once again, the citation of *Obiaya* is improper as a matter of law because the Examiner's rejection is based on anticipation, not on obviousness. In addition, rather than simply recognizing another advantage that flows naturally from the Day et al. patent, the Applicant proceeds in a manner that is directly opposite from that suggested by the Day et al. patent. The Applicant has instead provided a capability that is in no way suggested by the Day et al. patent.

Claim 23 is believed allowable for reasons similar to those described above for claim 10. The Worthington patent does not disclose a lawnmower that includes a roller assembly having a tow arm, and a quick connect assembly configured to selectively attach the tow arm of the roller assembly to the frame of the lawnmower. Rather, the Worthington patent discloses a gauge roller assembly that supports the lawnmower from the ground and that regulates the cut height of

the grass lawn (Col. 2, lines 38-50). Therefore, reconsideration is in order and is respectfully requested.

Claim 29 is believed allowable for reasons similar to those recited above for claim 16. The Day et al. patent does not disclose a lawnmower that includes, amongst other things, a roller assembly having a latch assembly that is located between front and rear links of a tow arm and that is selectively engageable to latch a roller assembly in a raised, inoperative position in which the rollers are incapable of rolling along a ground surface. In addition, the Day et al. patent does not disclose a spring which is disposed between front and rear links and which is configured to bias the roller assembly toward a lowered position in which the rollers can roll along a ground surface. The Day et al. patent thus does not disclose each and every element of the novel subject matter disclosed and set forth in claim 29. Therefore, reconsideration and withdrawal of the rejection is respectfully requested.

Claim 32 recites a roller assembly for a lawnmower that includes, *inter alia*, a roller assembly is incapable of dictating a cut height of the lawnmower. This characteristic is inherent in the disclosed floating roller assembly of the present application. A review of the cited references fails to teach each and every element of claim 32. Therefore, allowance of claim 32 is respectfully requested.

CONCLUSION

It is submitted that claims 1-32 are in compliance with 35 U.S.C. § 102 and each defines patentable subject matter. A Notice of Allowance is therefore respectfully requested.

No fee is believed due with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

The Examiner is invited to contact the undersigned by telephone if it would help expedite matters.

Respectfully submitted,

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Dated: 3-24-05

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APPENDIX A

Glossary of Spring Terminology

Active Coils (n_a)
Those coils which are free to deflect under load.

Angular relationship of ends
The relative position of the plane of the hooks or loops of extension springs or the legs of a torsion spring to each other.

Baking
Heating of electroplated springs to relieve hydrogen embrittlement.

Buckling
Bowing or lateral deflection of compression springs when compressed, related to the slenderness ratio (Free Length/Mean Coil Diameter).

Closed ends and squared
Ends of compression springs where pitch of the end coils is reduced so that the end coils touch and are square with the spring axis.

Closed and ground ends
As with closed ends, except that the end is ground to provide a flat plane.

Closed length
See Solid height

Close-wound
Coiled with adjacent coils touching.

Coils per inch
See Pitch.

Deflection (F)
Motion of spring ends or legs under the application or removal of an external load (P).

Elastic limit
Maximum stress to which a material may be subjected to without permanent set.

Endurance limit
Maximum stress at which any given material will operate for a determined number of cycles without failure for a given minimum stress.

Free angle
Angle between the legs of a torsion spring which is not under load.

Free length (L)
The overall length of a spring which is not under load.

Gradient
See Rate (R).

Heat setting
Fixturing a spring at elevated temperature to minimize loss of load at operating temperature.

Helix
The spiral form (open or closed) of compression, extension, and torsion springs.

Hooke's Law

Load is proportional to displacement.

Hooks
Open loops or ends of extension springs.

Hot pressing
See Heat Setting.

Hydrogen embrittlement
Hydrogen absorbed in electroplating or pickling of carbon steels, tending to make the spring material brittle and susceptible to cracking and failure, particularly under sustained loads. Proper baking is required to relieve the hydrogen.

Hysteresis
The mechanical energy loss that always occurs under cyclic loading and unloading of a spring, proportional to the area between the loading and unloading load-deflection curves within the elastic range of a spring.

Initial tension (P_i)
The force that tends to keep the coils of an extension spring closed and which must be overcome before the coils start to open.

Load (P)
The force applied to a spring that causes a deflection (F).

Loops
Formed wire shapes at the ends of extension springs that provide for attachment and force application.

Mean coil diameter (D)
Outside spring diameter (OD) minus one wire diameter (d).

Modulus in shear or torsion (G)
Coefficient of stiffness for extension and compression springs. (Modulus of Rigidity)

Modulus in tension or bending (E)
Coefficient of stiffness used for torsion and flat springs (Young's Modulus E).

Moment (M)
A product of the distance from the spring axis to the point of load application, and the force component normal to the distance line. See Torque.

Open ends, not ground
End of a compression spring with a constant pitch for each coil and the last coils not touching adjacent coils.

Open ends ground
"Open ends, not ground" followed by an end grinding operation.

Passivating
Acid treatment to remove contaminants and improve corrosion resistance of stainless steel.

Permanent set
A material that is deflected so far that its elastic properties have been exceeded and it does not return to its original condition upon release of load has taken a "permanent set."

Pitch (p)
The distance from center to center of the wire in adjacent active coils (recommended practice is to specify number of active coils rather than pitch).

Plain Ends
End coils of a compression spring having a constant pitch and not squared.

Poisson's Ratio
The ratio of the strain in the transverse direction to the strain in the longitudinal direction.

Preset

See Remove set.

Rate (R)
Change in load per unit deflection, generally given in pounds per inch. (N/mm)

Remove set
The process of closing to solid height a compression spring which has been coiled longer than the desired finished length, so as to increase the apparent elastic limit.

Residual stress
Stresses mechanically induced by set removal, shot peening, cold working, forming or other means. These stresses may or may not be beneficial, depending on the application of the spring.

Set
Permanent distortion in length, height, or positon which occurs when a spring is stressed beyond the elastic limit of the material.

Shot peening
Blasting the surfaces of the spring with pellets to induce compressive stresses and thereby improve fatigue life.

Slenderness ratio
Ratio of spring length (L) to mean coil diameter (D).

Solid height (H)
Length of a compression spring when under sufficient load to bring all coils into contact with adjacent coils; no additional deflection is possible.

Spring index
Ratio of mean coil diameter (D) to wire diameter (d).

Squared and ground ends See Closed and ground ends.

Squared ends
See Closed ends.

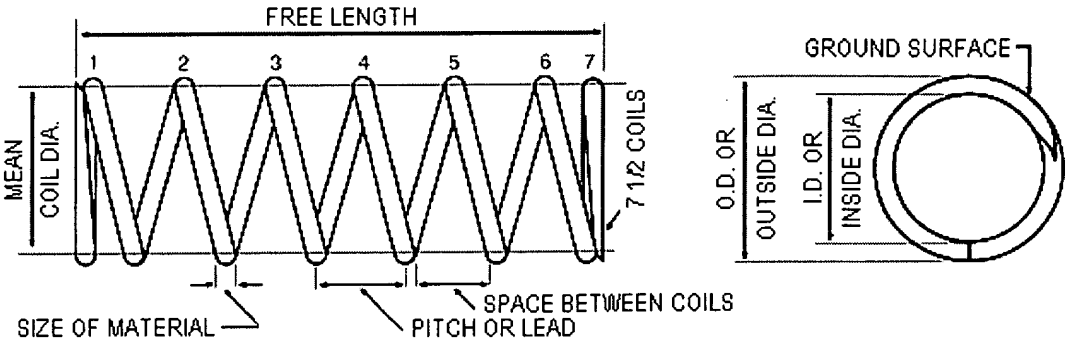
Stress range
The difference in operating stresses at minimum and maximum loads.

Stress relieve
To subject springs to low-temperature heat treatment so as to relieve residual stresses.

Torque (M)
A product of the distance from the spring axis to the point of load application, and the force component normal to the distance line.
A twisting action in torsion springs which tends to produce rotation, equal to the load multiplied by the distance (or moment arm) from the load to the axis of the spring body. Usually expressed in oz./in., lb./in., lb./ft., or in. N/mm.

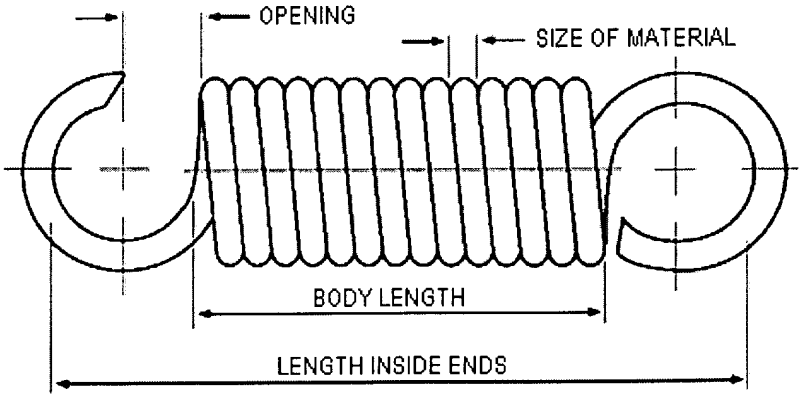
Total number of coils (N_t)
Number of active coils (N_a). For compression springs, active coils (Na) plus the number of dead coils forming the ends.

Wahl Factor
A factor to correct stress in helical springs effects of curvature and direct shear.



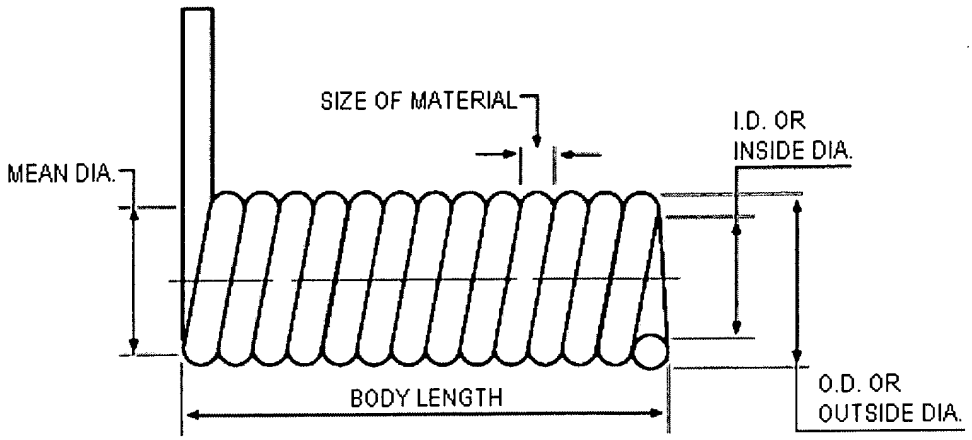
Compression Springs

Helical compression springs have applications to resist applied compression forces or in the push mode, store energy to provide the "push". Different forms of compression springs are produced. There are conical, barrel, hourglass, or straight conical compression springs. These compression springs can be made with or without variable spacing between coils. Round wire springs can store more energy than rectangular wire compression springs.



Extension Springs

Extension Springs exert a pulling force or energy. They are usually close wound with initial tension and are mostly made from round wire. The design of the extension springs' ends are limitless. Hooks, loops, bends, crossbars, etc.



Torsion Springs

A torsion spring provides rotational energy or torque. You can have a single bodied or double bodied torsion spring. You must have three points of support and the body usually sits on a shaft or arbor. Again, the design of the ends or legs of a torsion spring are limitless. The stress in a torsion spring is bending. Round wire is still the preferred material due to the cost of rectangular wire, even though rectangular is more efficient in bending.
